TITLE: AUTOMATED MEASUREMENT OF SMOKE CONDENSATES

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ABSTRACT: Flow Injection Analysis (FIA) has been applied to the spectrophotometric measurement of total smoke condensates. The FIA apparatus consists of a liquid chromatographic pump, automatic sample injector, and ultraviolet/visible detector. Smoke condensates extracted from cigarette filters or from Cambridge pads are injected into a nonsegmented solvent stream at a rate of one per minute. An electronic integrator reports the sample absorbance either as a peak height or as an integrated peak area. The analytical wavelength is selected to minimize interferences yet permit a good signal for the smoke condensate. The method can be used to estimate smoke condensate delivered or filtration efficiency. The smoke condensate measurement can be related to FTC tar delivery by calibration. Agreement between filtration efficiencies measured by the conventional spectrophotometric method and those measured by FIA spectrophotometry are excellent, and the ability of the FIA method to distinguish efficiency differences is superior. The observed filtration efficiency is nearly independent of the wavelength at which the measurement is made over a wide range. Advantages of the method are simplicity of sample preparation and high sample throughput. The measurement can also be extended reliably to low deliveries. The prospects for applying this method in a quality control environment seems good.

REVIEW: The author presented an automated spectrophotometric method for the measurement (at 310 nm) of methanol-extracted smoke condensate from cigarette filters or Cambridge filters. The method is used in quality control work to measure smoke condensate delivered from the cigarette or to determine filtration efficiency. Critical variables of the method are solvent flow rate, volume of sample injected, sample concentration, cell path length, measurement wavelength, and choice of peak height or peak area response. Good linear response of peak area versus relative concentration of condensate was recorded for diluted solutions of a concentrated smoke condensate eluted from Cambridge filters. The most serious limitation of the method is the requirement of a separate calibration for each cigarette brand. The advantages of the method are the simplicity of sample preparation, rapidity and reliability of the analysis, and the ability of the technique to accurately measure smoke condensates from low delivery cigarettes. The method does not appear to offer any advantages over the automated fluorescence method of Mr. Eddie Thomas (R&D) for the determination of FTC tar of low delivery cigarettes.

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